SECTION I—CLAIMS

Amendment to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application. Claim 1 is amended herein. Claims 1-29 remain canceled herein without prejudice. New claims 45-49 are presented herein.

Listing of Claims:

1-29. (Canceled).

30. (Currently amended) A method comprising:

receiving content, at a diversity agent, the content for transmission from a wireless communication system having M transmit antennae and N receive antennae and Nc subcarriers, where $Nc \gg M,N$, the received content for transmission from more than two of the M transmit antennae, wherein the received content is a vector of input symbols (**s**) of size Nc x 1, and wherein the Nc subcarriers is the number of subcarriers of a multicarrier wireless communication channel of the wireless communication system; and

generating a rate-one, space-frequency code matrix from the received content for transmission via the more than two of the M transmit antennae by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of MG subcarrier spacings.

31. (Previously Presented) A method according to claim 30, further comprising:

dividing each of the pre-coded vectors into a number of LM x 1 subvectors; and

creating an M x M diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g, \cdots, \Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1...L$ from the subvectors.

32. (Previously Presented) A method according to claim 31, further comprising:

interleaving the L submatrices from the G groups to generate an M x Nc space-frequency matrix.

33. (Previously Presented) A method according to claim 32, wherein the space-frequency matrix provides $M N L$ channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M, receive antennae N and channel tap(s) L.

34. (Previously Presented) A method according to claim 30, wherein the space-frequency matrix provides $M N L$ channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M, receive antennae N and channel tap(s) L.

35. (Previously Presented) An apparatus comprising:

a diversity agent:

to receive content for transmission from a wireless communication system having M transmit antennae and N receive antennae and Nc subcarriers, where $Nc>>M,N$, the received content for transmission via a multicarrier wireless communication channel of the wireless communication system, wherein the received content is a vector of input symbols (**s**) of size Nc x 1, and wherein the Nc subcarriers is the number of subcarriers of the multicarrier wireless communication channel;

and

to generate a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from more than two of the M transmit antennae by dividing the vector of input symbols into a

number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of MG subcarrier spacings.

36. (Previously Presented) An apparatus according to claim 35, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of LM x 1 subvectors, and to create an M x M diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g, \cdots, \Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1 \ldots L$ from the subvectors.

37. (Previously Presented) An apparatus according to claim 36, wherein the space-frequency encoding element interleaves the L submatrices from the G groups to generate an M x Nc space-frequency matrix.

38. (Previously Presented) An apparatus according to claim 37, wherein the space-frequency matrix provides $M N L$ channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M, receive antennae N and channel tap(s) L.

39. (Previously Presented) An apparatus according to claim 35, wherein the space-frequency matrix provides $M N L$ channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M, receive antennae N and channel tap(s) L.

40. (Previously Presented) A wireless communication system comprising:

a number M of omnidirectional antennas, wherein M comprises more than two omnidirectional antennas;

a number N of receive antennae;

a number *Nc* of subcarriers of a multicarrier wireless communication channel of the wireless communication system, where $Nc >> M, N$; and

a diversity agent:

to receive content for transmission via the multicarrier wireless communication channel, wherein the received content is a vector of input symbols (**s**) of size *Nc* x 1, and

to generate a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from at least a subset of the *M* omnidirectional antennas by dividing the vector of input symbols into a number *G* of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number *G* of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of *MG* subcarrier spacings.

41. (Previously Presented) A wireless communication system according to claim 40, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of *LM* x *1* subvectors, and to create an *M* x *M* diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g, \cdots, \Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1 \ldots L$ from the subvectors.

42. (Previously Presented) A wireless communication system according to claim 41, wherein the space-frequency encoding element interleaves the *L* submatrices from the *G* groups to generate an *M* x *Nc* space-frequency matrix.

43. (Previously Presented) A wireless communication system according to claim 42, wherein the space-frequency matrix provides *M N L* channel diversity, while preserving a code rate of

1 for any number of the omnidirectional antennas M, receive antennae N and channel tap(s) L.

44. (Previously Presented) A wireless communication system according to claim 40, wherein the space-frequency matrix provides $M N L$ channel diversity, while preserving a code rate of 1 for any number of the omnidirectional antennas M, receive antennae N and channel tap(s) L.

45. (New) The method of claim 30, wherein the diversity agent comprises an encoder to generate the rate one, space-frequency code matrix from the received content using a space frequency code, wherein the method further comprises:

the encoder applying the space frequency code to the received content to generate the rate-one, space-frequency code matrix, wherein the space frequency code only consumes one multicarrier communication channel block duration.

46. (New) The method of claim 45, further comprising:

transmitting the space frequency code in one OFDM block duration.

47. (New) The method of claim 30, further comprising:

passing the rate-one, space-frequency code matrix as encoded content from the diversity agent to one or more inverse discrete Fourier transform (IDFT) elements; and

transforming the encoded content from frequency domain into time domain content.

48. (New) The method of claim 47, wherein a quantity of the IDFT elements is commensurate with a quantity of the M transmit antennae.

49. (New) The method of claim 48, further comprising:

passing the time domain content to one or more cyclical prefix insertion (CPI) elements to introduce a cyclical prefix or a guard interval prior to transmission via the M transmit

antennae.